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MODERN AUDIOMETER AND HEARING AIDS

THEIR ROLE IN THE INVESTIGATION OF HEARING AND RELIEF OF DEAFNESS

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An impressive amount of investigation is continually in progress, not only in refining diagnostic procedures but also in the investigation into cochlear function. Every Ear, Nose and Throat Journal has one or more papers on hearing aids and audiometry in each issue.

At the recent International Ear, Nose and Throat Congress in London, no less than three pre-congress days were devoted to a consideration of these subjects. With this advance, there has been a corresponding interest and research into the problems of the deaf child, the early diagnosis of deafness, the charting of islets of hearing, the production of children's audiometers, and the training of the deaf child in lip and speech reading (Jena School) and speech.

There are two terms which must be defined. One is rehabilitation and the other auditory training. The former may be described as the mobilization of all the resources of the patient in order to obtain his complete adjustment to social and economic needs. It has been embodied in every scheme of social planning and may include operations, irradiation, fenestration, hearing aids, lip reading, speech reading (Jena School) and auditory training.

Auditory training is the re-educational process of helping a deaf person to use his residual hearing, supplemented by a hearing aid and speech reading.

The audiometer is an instrument for the computation of hearing loss; its unit of measurement is the decibel. It utilizes pure tones representing the frequency range of speech from 128 to 8,192 cycles.

The ability of the ear to perceive individual tones at minimal intensity levels is calculated in decibels and designated as the threshold of the individual tone.

The hearing aid, and there are many types, is characterized by a microphone, an amplifier and a telephone receiver. It is used for the alleviation of deafness after audiometric examination has established the type and degree of the hearing defects.

The Magnitude of the Problem. The application of audiometry to the deaf population has been met by various means, which will be described later, but the figures disclosed by the social survey demonstrate that there are about 2¼ million people in Great Britain who seek relief from deafness. H. G. Wells claims that there are about 6½ million with defective hearing. The execution of such a survey involves many scientists and other officers. Their backgrounds are anthropology, biometrics, economics, mathematics, sociology and statistics. While the survey actually is conducted by the enlisted officers, they have the support of the team at all times.

Deafness varies in degree, and Beazly of the United States has divided the population into several categories[1], varying from a difficulty in understanding speech in church, theatres, or group conversation, whilst hearing speech at close range[2], to the person born deaf or who acquired deafness sufficiently early in life to prevent his learning speech. The hearing aid is not only used for the deaf but for the hard of hearing who, e.g. do not feel comfortable except in the front rows of the theatre.

The number of otosclerotics among these millions is calculated at 6%. If the fenestration operation for otosclerosis has caught the imagination of the otologists and the public, it is clear that the great mass of deafened humanity must depend for relief on hearing aids, and their much less imaginative appeal but not lesser efficiency.

It is reasonable to suppose that this era corresponds to a time when spectacles were imperfect, and the means of examining the patient also.

The reluctance to use them no doubt was as marked as the resistance opposed to hearing aids to-day; in fact many people, apart from other considerations, prefer the operation of fenestration to using a 'crutch'.

The Organ of Hearing. This organ possess a sensitivity that is amazing. When we were in Harvard in a sound-proof room, and Prof. H. Davis asked some of

us if we could hear any sound, some declared they could and Davis announced that the normal ear in these conditions should be able to appreciate the collision of the molecules of the air. On the authority of Watson, of the United States, the ear is 10 times more sensitive to sound than the retina in its relation to its most sensitive colour, green. In view of this, it is apparent that the difficulty of hearing ordinary conversation by a patient shows he is in fact much deafer than he knows.

As measured by the audiometer, the human ear is capable of perceiving pure tones from 0-130 decibels.

The Functions of the Audiometer. Scott Stevenson summarizes as follows:—

1. Diagnosis of the hearing loss.
2. Prognosis of the trouble. Does the patient require a hearing aid, fenestration, or auditory education? To discover the deaf in school children, by group testing in schools, industry and military service; to follow the worker in his jobs and evaluate the damage done to his hearing, by constant noise, either high or low.
3. *Purposes of Evaluation.* Treatment: tonsillectomy, fenestration, irradiation?
4. *Prosthesis.* How well is the hearing aid doing?
5. *Auditory Training.* What is its value for the assessment of social adequacy? Can a person hold down a particular job? Can he go to church? Should he have a pension?
6. To assist in the selection of the optimal hearing aid among several.

The basic qualities of any hearing test are:—

1. Reliability.
2. Validity.
3. Is the test the same to-day as yesterday? Am I really testing what I say I am testing?

The audiometer test is not entirely an objective test. Its accuracy depends on many factors: the patient's interest, his co-operation and the absence of distracting noises. The test requires alertness and concentration. Finally, the evaluation of the hearing in any individual case requires a careful consideration and weighing up of the history, otological examination, the result of noise and tuning fork tests, sometimes monochord tests, the pure audiometer chart and the result of speech auditory tests.

The Ambient Noise. It has been claimed by the Committee of the Section of Otology of the Royal Society of Medicine that a sound-proof room is not necessary for routine, pure tone, threshold testing in otological practice, but the Committee of the American Otological Society concludes that: 'If a patient's hearing is impaired to such an extent that he cannot hear room noises, clinical tests can be made equally well with room noise or without it, but if a patient can hear the room noise, it impairs his acuity of hearing and therefore the accuracy of our clinical tests by air and bone, so that we can err in the degree and also in the type of the deafness.'

For young children, speech tests are much better than pure tone. We use a fading intensity level and a vocabulary to suit a child. Digits, monosyllabic numbers, are best.

The application of the audiometer to children is most important for various reasons, above all to discover islands of hearing. We saw audiograms of children of 5 and 6 years. The application of the audiometer calls for the co-operation of the patient and the help of the mother. The patient is required to state when the threshold of the tone is heard. It is useless for infants and very young children.

It is important to recognize defective hearing in a child as early in life as possible. It has been pointed out that the normal deveoplment of speech depends on whether enough sound stimuli reach the acoustic centres and the Wernicke centre. When these are charged often enough with stimuli, and it must be a constant process, then the impetus is sufficient to supply the energy for the development of spontaneous speech (Froeschels).

Walter Hughson and Eva Thomson made audiograms in children from two years up. Urbantschitsch employed whistles and Froeschels has used these to demonstrate hearing when the audiometer had indicated complete deafness. The testing of hearing has been done by the same observer, in babies from one to nine days old, and his success with whistles would indicate the necessity of further study to take advantage of a very early knowledge of the presence of deafness. The I. and A. Ewing School demonstrated at the Congress. They used voice and speech tests, percussion toys, pitch pipes and meaningful sounds, e.g. clink of feeding bottles, etc., in children of one month to five years. A further examination by the tunnel test, designed to measure a child's threshold of hearing of pure tone was also shown. An elaboration of the test by Hallpike is known as the 'peep-show test'. The child's audiometer an adaption of the peep-show is a most valuable instrument in that it draws attention early to the child whose hearing is not normal.

The Peep-show Test. For children of three to six years it is carried out in this manner. A wooden box is presented to the child and within it is an attractive picture that can be seen by pressing a button, but this action is only successful when a light-sound signal is given by a tester who observes the child from behind a screen.

Pure tone sound, synchronised with light flashes are emitted by a loud speaker calibrated for intensity in decibels above the normal threshold, in the head position of the child, who quickly associates the two signals and presses only when he is given the double signal. If the child is deaf and the tester eliminates the light signal, nothing happens, but if he hears the signal, he presses the button as before. By altering the frequency and intensity of the sound signals, a pure tone audiogram is obtained in this way. It is accurate and easily applied.

The use of audiometers for the examination of patients suffering from otosclerosis is important from the diagnostic standpoint and forms an estimate of the patient's hearing and the suitability for operation. Later the audiometer is used to evaluate the operative result. Both the pure tone and speech tests are used. This leads one to a consideration of certain defects in the pure tone audiometer; but the defects, according to some observers, are not so much in the apparatus as in

ourselves and our faulty knowledge of hearing. Two audiometers correctly calibrated may vary considerably in their results. This lays audiograms open to doubt and criticism.

With the audiometer it is impossible, according to some observers, to distinguish between conductive and perceptive deafness. Békésy has used a method to differentiate the two types, but there is ample evidence that middle ear lesions can diminish bone conduction, in the same way as lesions of the inner ear. The audiometer is not a perfect instrument, but it is the best we have and our hope is that by the employment of the supplementary tests, and the speech tests, we will attain a more faithful picture of the auditory organ.

Pure bone audiometry, in the opinion of Walsh and Silverman, is open to serious objection and, alone, is no criterion as a guide to the diagnosis of otosclerosis or to assess suitability for operation. Many observers have come to the same conclusion. Wishart states the pure tone audiometer determines how well the ear perceives a few octaves of pitch, but hearing is not so simple.

We hear, not single tones, but sound patterns and the flash images that are produced are complete pictures. It takes two years of beginning life to develop even a memory of these pictures. Pitch hearing tells us nothing of how speech is heard. Some workers have tried to correlate the findings of the speech audiometer and the pure tone audiometer. 'How foolish,' Wishart observes. The audiometer tests different things and it is impossible to tell how well a person hears speech from studying a frequency audiogram. Basically and finally, we as otologists are concerned with speech. The pure tone audiometer has become recognized as a reliable means of estimating a patient's hearing threshold of discrete tones, and from this has come the belief that a patient's tone hearing has not improved unless his audiometric curve has improved also . The belief is widespread and it is not true.

The recognition of this fact is of great importance in the assessment of hearing after fenestration.

Many additional techniques to test hearing have developed from audiometry and other original observations must be recorded in the discovery of Loudness Recruitment (L.R.).

Loudness Recruitment. Denes and Nanton state: 'An ear is said to show recruitment when its sensitivity is subnormal to sounds at low sensation levels, but more nearly normal at high sensation levels.' The L.R. shows that by increasing the intensity of tone in the deaf ear and comparing it with the good ear, a point is reached where hearing in the bad ear is equal to that of the good ear and may surpass it. Fowler first described this phenomenon, known also as the loudness balance test, in 1938. There is general agreement that it is absent in pure middle ear disease, and it is present in a wide variety of internal and cochlear nerve disorders, including Ménières disease, described collectively as 'nerve deafness'. It has, therefore, been regarded as an additional test for differentiating between nerve and conduction deafness, and further investigation by Hallpike, Dix and Hood goes to establish an important clinical difference between nerve deafness due to the disease of Corti's organ and that of the cochlear nerve fibres.

There are numerous ways of showing recruitment:—

The Test for the Recruitment Phenomenon (*L.R. Phenomenon*): *Fowler's Technique.* The subject wears a set of telephone receivers, each supplied by a separate pure tone audiometer or preferably by a single audiometer. Let us take as an example a case of unilateral nerve deafness of 30 decibels. If we begin at zero threshold with a frequency of 1,000 cycles per second, switching from one ear to the other and increase gradually to 30 decibels, the patient then becomes aware of sound in his deaf ear, but naturally the intensity of the tones is unequal. By gradually increasing to 80 decibels and alternating the sound as before, we eventually find that both ears hear equally well. The initial deafness of 30 decibels has disappeared. This is the essence of the Loudness Balance Test or The Loudness Recruitment phenomenon (L.R.).

Should we now repeat the operation, for example, with a case of unilateral *conduction* deafness of say 30 decibels loss, it would be found that, however much we increase the intensity of the sound, a difference of 30 decibels is always present between the two ears so that we can never make them hear with equal intensity. However, Hallpike *et al.* established an important diagnostic difference between the deafness of Ménière's disease and that of pure eighth nerve neuritis, resulting from pressure of a neurofibroma.

They employed the L.R. and the intelligibility tests for amplified speech in order to establish their observations. They found that L.R. is characteristically present in Ménière's disease and characteristically absent in the type of neuritis mentioned. This would seem to be contrary to the general reaction in nerve deafness and disorders of the internal ear, in which it is common to find the L.R.; in fact, the absence of L.R. in neurofibroma cases approximates the reaction characteristic of conductive deafness. Research is being carried out to find the reason.

There is evidence to prove that a distention of the endolymphatic canal is characteristic of many cases of Ménière's disease. Degeneration of the organ of Corti and the hair cells is the result of pressure of the endolymphatic fluid (whilst in the neurofibroma nerve deafness investigated by Hallpike, exactly the opposite occurred and it was found that Corti's organ was generally preserved, but the nerve fibres were degenerated, coupled with changes in the spiral ganglion and its nerve fibres.

The employment of intelligibility tests for amplified speech showed that, whereas amplification of the tone was generally surprisingly helpful in neuritis, in Ménière's disease, speech intelligibility deteriorated with the amplification of the tone.

This latter observation is important in that it draws attention to a possible error of diagnosis, in confusing an early eighth nerve neurofibroma with an early unilateral otosclerosis (Hallpike *et al.*, Proc. Roy Soc. Med., 42, No. 7).

Loudness recruitment may be established with varied techniques, binaurally or monaurally, by the intensity difference limen (Denes and Nauton, J. Laryngol. Otol.,

62, No. 5, May, 1949); by the method of de Brüine Altes (' *The Symptom of Regression in Different Kinds of Deafness*, Thesis, University of Groningen, Holland ') he contrasts the rate of the increase of loudness in a tone with the increase of intensity of the tone for normal and deafened persons. The technique consists in comparing the increase in the masking effect of one tone on another as the intensity of the masking tone is raised. Tibor Halm (J. Laryngol. Otol., 63, 464) using a Pulvári audiometer, has established a ' difference limen ' in this way. Beginning below threshold in all frequencies, the intensity of the tone is increased by two decibels a second until the patient signals that he first hears. The tone is then decreased until the patient signals he just ceases to hear. This difference is the ' difference limen ' (D.L.). He found that the D.L. is the same in all frequencies in conductive deafness, and in normal hearing, whereas in perceptive deafness it may vary as much as 10 decibels in low tones and two decibels in high tones. All these techniques are used in modern Deafness Clinics.

Hearing Aids. At the International Congress the presentation of the ' Medresco ', the British Government's Hearing Aid, was made by the associated scientists and acoustic engineers who took part in the investigation. They explained (*Hearing Aids and Audiometers*, No. 261, H.M. Stationery Office) why they had selected an aid that cut down the lower frequencies and uniformly boosted the higher ones from 750 c.p.s. to 4,000 c.p.s. In agreement with them are Hallowell Davis and Silverman, who would suggest an alternative choice of two or at the most three, models, but affirm that a uniform amplification of high tones, regardless of the nature of the patients' defects, meets the case of the majority of persons desiring aids.

The partisans of selection or fitting claim that the only satisfactory method is to find the type most adapted to the patient. However, experts find such superficial differences between aids, that as they are apt to regard them as relatively unimportant in the general desire to find a majority solution, but the patients claim that they can appreciate the slight differences, even if scientists cannot.

It would seem that standard hearing aids will eventually replace the numerous commercial aids of to-day. No instrument should have less than 30 decibels gain and all should have an individually moulded ear insert. Another point of great importance that was stressed was the necessity of the careful indoctrination in the use of the aid. Hirsch (Harvard) said it was as important as the aid itself, and compared it to the gift of a violin, which the recipient must learn to play before he can enjoy pleasure and satisfaction. At Deshon Military Hospital the process of the selection of an instrument lasts 15 days. This does not mean that the preliminary pure tone audiometer test is altogether useless, because it helps somewhat in showing the pattern of the loss and the type of frequency response which should be favoured. Of these 15 days, the largest fraction is given over to teaching the patient the process of accustoming his ear and brain to a new set of conditions, in other words, indoctrination. The question often arises whether one should recommend a hearing aid or fenestration.

Gordon Berry states that a well-fitting hearing aid offers more hearing at less expense, with less hazard and worry. A well-fitting hearing aid, says Berry, can give greater amplification than the fenestration operation to a much wider group of patients.

Lempert says that 80% of the deafened people who came to him with hearing aids and although hearing well with them, desired an operation so as to disguise their infirmity. Shambaugh states that all his operated patients who had worn hearing aids were predominantly in favour of the operation.

S. R. Silverman states that there are many views on this subject (' A Voice from America ' in *The Silent World*, June, 1949) from conservative anti-fenestration advocates to the promiscuous in acceptance of fenestration. He feels that the technique is a good one, that the operation has come to stay, but that we must focus on certain points before we can pass a final judgment. The major problems to be solved are the proper selection of cases, the prognosis of the operation, the surgical technique and finally, the most important of all, not only the permanence, but the secondary degeneration that takes place in otosclerosis. The operation is performed and frequently the deterioration of the nerve leaves the patient as bad as before.

It might be summarized, as Scott Stevenson has done, that a patient with clinical otosclerosis, rapidly growing worse and unable to get satisfaction from hearing aids or to adjust himself to their use and who is suffering intensely, should be operated on, but that if the process of deafness is slow and he is not greatly handicapped, having good hearing in one ear, and if he can be trained to lip read, then he should not be operated on.

FUTURE OF HEARING AIDS

Despite the fact that we cannot replace degenerated nerve fibres, many cases of nerve deafness get great relief. Conversation with users of the Medresco, young and old, and with parents of deaf children of 2½-3 years, who are acquiring speech with this aid, give an impression that is most gratifying.

Silverman goes so far as to recommend the use of aids to children who have no speech intelligibility even with the aids, in order to be able to appreciate the rhythm and form of speech, so as to improve their own. The transister (Silverman, *The Silent World*, June, 1949), a tiny instrument the size of a match head, seems destined to replace the present diminutive vacuum tubes or valves, as the British call them. It is at present being developed. The perfect aid has not yet been constructed, but the improvement is gratifying.

Hearing aids and lip reading are opposite faces of the same coin, and are destined to work together. This must not be forgotten. Finally, as Douglas Macfarlane states: ' The intelligent deaf public is expecting better hearing testing work from the otologist '. If we do not accept the obligation we shall experience the advent of the half-trained audiometrist or audiometrician who will certainly assume a role beyond his capacity. In fact, events in South Africa have already advanced

beyond this stage, as apparently a hearing aid clinic, dedicated to selling aids, is already functioning without any otologist on the so-called examining staff. This is serious. Otologists must superintend the entire operation of the examination of the patient and the prescription for the hearing aid must be given by them. The commercial aid vendor should limit himself to the sale of his product. Only in this way can the deaf patient be assured of the necessary protection from suffering and pecuniary loss. A concerted effort on the part of the otologists is necessary to invoke legal sanction on any departure from this principle. It must not be forgotten that indoctrination in the use of the aid must be the job of the otologist or supervised by him.

The arguments in favour of the adoption of urgent measures to protect a suffering section of the population should be immediately obvious to the authorities and require no elaboration.

The work of the modern hearing clinics and the patient labour of the women technicians with deaf children and adults, recall the words of the Manchester author, I. R. Ewing, that the maximum of help through combined hearing aids and lip reading at every stage of deafness makes possible the banishment of the fear that this disability may undermine the sufferer's efficiency and happiness. It need not do so.

ABSTRACTS

Circumcision and Venereal Disease. Hand, Eugene A. (1949): Arch. Dermat. Syph., **60,** 341.

It was found that gonorrhoea and syphilis occurred less frequently in the circumcised. Chancroid was rare and lymphogranuloma venereum was not found in a circumcised person. Balanitis due to Vincent's organism did not occur in the circumcised. Condylomata acuminata are very rare, though herpes progenitalis occurred in the same proportion in circumcised and uncircumcised patients.

Aureomycin Employed Locally in Painful Mouth Ulcerations. Distelheim, L. H. and Sulzberger, M. B. (1949): J. Invest. Derm., **13,** 115.

A patient with persistent painful oral ulcerations of five years' duration, diagnosed clinically as aphthous stomatitis or periadenitis mucosa necrotica recurrens, was rapidly improved and apparently cured by mouth rinses of ½% aureomycin in water four times daily. No previous treatment had been more than temporarily effective.

Treatment of Syphilitic Aortitis with Mercuric Cyanide over a Long Period. Gerbaux, A. (1949): Semaine des Hopitaux. **25,** 3125.

A report on the results of treatment of 73 patients with syphilitic aortitis. Seventeen were uncomplicated cases, 22 had angina and 34 had symptoms of cardiac insufficiency. Many of the cases were treated and followed for significantly long periods. Symptomatic improvements and mortality rates are apparently better than with arsenic-bismuth treatment. Toxic effects were not important. The author states that, for best results, the mercuric cyanide should be given in courses of 50 to 100 daily intravenous injections (150 to 200 at the start) with intervals of one month in the period of attack and not exceeding two or three months. Treatment must be long continued.

Evaluation of Topical Dichloroxyquinaldine (Sterosan) as a Therapeutic Agent in Dermatology. Tronstein, A. J. (1949): J. Invest. Derm., **13,** 119.

Dichloroxyquinalidine, an oxyquinolin derivative, has been tested on a variety of unrelated dermatoses and appears to be safe and satisfactory as a local application. The best results were seen in infective conditions caused by Gram positive organisms. In most cases there was little or no evidence of serious toxic effects. It appears to be less sensitizing than the related compound Vioform.

Arsenical Encephalopathy Treated with B A L (Encefalopatia arsenical tratada con B A L). Gomez Orbaneja, J. and Risco, A. (1949): Actas Dermo-Sif., **50,** 783.

The patient, a man aged 22, had sero-negative primary syphilis and had received 5.70 gm. neoarsphenamine and 1.27 gm. bismuth metal over a period of about six weeks when he developed symptoms and signs typical of severe arsenical encephalopathy. The cerebrospinal fluid gave a positive reaction for globulin and contained 50 cells per c.mm. He was treated with B A L, 4 c.c. every four hours for eight doses, and then at longer intervals to a total dose of 2.8 gm. He was also given vitamin B1 and magnesium sulphate intravenously on two occasions. Improvement began after the second B A L injection, and complete recovery followed.

Kaposi's Disease Progressing to Lymphosarcoma (Maladie de Kaposi à évolution Lymphosarcomateuse). Belloni, L. (Milan). Annales de Dermatologie et de Syphiligraphie, **1,** 45-57, 1949.

The author gives a good account of Kaposi's disease and the theories of its origin. A case is described in which the autopsy findings showed evolution towards lymphosarcoma (illustrated with photomicrographs).

Kaposi's disease is considered to be a hyperplastic mesenchymopathy with multiple systematized foci presenting the following principal characteristics:

(*a*) A marked poikiloblastic tendency, i.e., a capacity of differentiation in various ways:

1. Angioblastic, predominating in cutaneous and intestinal lesions;
2. Fibroblastic, responsible for the cicatricial regression of lesions;
3. Macrophagicopexic;
4. Haematopoietic (cells of the lympho-monocytic type, Flarer's cells).

(*b*) A possibility of leukaemic and neoplastic evolution.

Radiotherapy of Recurrent Herpes (Nouvelles données sur la radiothérapie de l'herpès récidivant). Frankl, J. (1949): Ann. Derm. Syph., **2,** 168.

The author reports excellent results in a small number of cases of recurrent herpes febrilis treated with soft X-rays in the inflammatory stage. One or two doses sufficed in the 12 cases reported. The affected area and the skin for a finger's breadth around is treated; dosage 130 r, 80 kv, 3Ma, 1.2 mm. Al. distance 23 cm.

Cytology of Herpes Zoster Vesicle Fluid (La citologia del liquido de la vesiculo del herpes zoster (Zona)). Ortiz, A. T. (1949): Actas Dermo-Sif., **50,** 799.

Eight cases were examined. The fluid from fresh vesicles contains few cells, neutrophils and eosinophils. On the second day there is an invasion of polyblasts. From the beginning all cellular elements are affected by cytolysis so that by the fourth day only nuclear fragments remain. This picture is like that of varicella except that in zoster there are eosinophils, suggesting an allergic process. First contact with the virus would give varicella; a second infection might produce zoster.

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VAN DIE REDAKSIE

NUWE VERSLAAFMIDDELS

Gedurende die afgelope jare is daar baie nuwe sintetiese verdowings- en pynstillende middels ontwikkel vir gebruik as vervangmiddels vir morfien. Die vraag ontstaan nou of dit sal blyk dat hierdie middels gewoontevormend is en dus tot die groep stowwe behoort wat onder die konvensies van 1925 en 1931 val en of hulle, aan die ander kant, as stowwe ‚wat saamgestel is en die herwinning van bedoelde middels in die praktyk uitsluit', van sodanige beheer vrygestel kan word.

Die Ekonomiese en Maatskaplike Raad van die Verenigde Volke is die gesagsliggaam wat daarvoor verantwoordelik is om regerings te verwittig van die middels wat onderhewig gestel word aan die internasionale konvensies betreffende verdowingsmiddels. Die deskundige komitee van die Wêreldgesondheidsorganisasie (WHO) tree as 'n adviserende liggaam op. Indien dit deur die Uitvoerende Raad van WHO goedgekeur word, word die aanbevelings vir die toevoeging van nuwe verdowingsmiddels tot die lys stowwe wat aan beheer onderhewig is, of vir moontlike vrystelling daarvan, aan die Ekonomiese en Maatskaplike Raad gestuur. Hierdie prosedure is in navolging van die prosedure wat deur die Volkebond geskep is. Op 19 November 1948 het die Verenigde Volke 'n nuwe protokol aangeneem waarby die sintetiese produkte wat gedurende en sedert die oorlog uitgevind is onder internasionale beheer geplaas is. Tot dusver het ses-en-veertig lede en ses nasies wat nie lede van die Verenigde Volke is nie reeds die protokol onderteken.

Die volgende stowwe en groepe stowwe is aanbeveel vir inlysting onder die bestaande internasionale konvensies vanweë hulle moontlikhede van gewoontevorming:

Valbien. Hierdie middel is aan beheer onderhewig vanweë sy bestanddeel van dihidrooxikodeïnon hidrochloried, die moontlikheid om hierdie alkaloïed uit die samestelling terug te win, en die aanwesigheid van barbituur, wat 'n bykomstige gevaar van gewoontevorming uitmaak.

Metopon hidrochloried (*Metieldihidromorfinoon hidrochloried*). Skeikundig is metopon hidrochloried 'n morfienderivaat; dit is 'n kragtiger pynstiller as morfien en het naastenby dieselfde eienskappe wat vatbaarheid en gewoontevorming betref.

Asetielkodoon (*asetieldihidrokodeïen hidrochloried*). Hoewel geen bepaalde inligting omtrent die gewoontevormende eienskappe daarvan beskikbaar was nie, het die komitee gemeen dat hierdie stof onder beheer

EDITORIAL.

NEW HABIT-FORMING DRUGS

Many new synthetic anaesthetics and analgesic drugs, for use as substitutes for morphine, have been evolved in recent years. The question now arises whether these drugs will prove to be habit-forming, and thus belong to the group of substances governed by the Conventions of 1925 and 1931, or whether, on the other hand, as substances 'which are compounded, and which in practice preclude the recovery of the said drugs', they may be exempted from such control.

The Economic and Social Council of the United Nations is the authority responsible for notifying governments of the drugs which are placed under the international conventions governing narcotic drugs. The WHO expert committee acts as an advisory body. If approved by the Executive Board of WHO, its recommendations for the addition of new drugs to the list of substances subject to control, or for their possible exemption, are transmitted to the Economic and Social Council. This procedure follows that established by the League of Nations. On 19 November 1948 the United Nations adopted a new protocol, bringing under international control the synthetic products discovered during and since the war. Forty-six members and six nations which are not members of the United Nations have already signed this protocol.

The following substances and groups of substances have been recommended to be brought under the existing international conventions on account of their habit-forming potentialities:

Valbine. This drug is subject to control on account of its content of dihydrooxycodeinone hydrochloride, of the possibility of recovering this alkaloid from the preparation, and of the presence of a barbiturate, which constitutes an additional habit-forming danger.

Metopon hydrochloride (*methyldihydromorphinone hydrochloride*). Chemically metopon hydrochloride is a morphine derivative; it is a more powerful analgesic than morphine and has approximiately the same properties as regards tolerance and habit-formation.

Acetylcodone (*acetyldihydrocodeine hydrochloride*). Although no specific information was available on its habit-forming properties, the committee considered that this substance should be placed under control because it is convertible to dihydrocodeine, which in turn is

geplaas behoort te word omdat dit tot hidrokrodeïen herlei kan word, wat weer tot dihidromorfien, en verslaafmiddel, herlei kan word. Dieselfde oorwegings geld in die geval van ander esters van dihidrokodeïen en soute daarvan, en van dihidrokodeïen en soute daarvan.

Dolantien (*Demerol, Petidien, Pirodosal*) (*1-metiel-4-feniel-piperidien-4-karboonsuur etiel ester*). Vanweë die sterk gewoontevormende eienskappe van hierdie stof en soute daarvan het die komitee aanbeveel dat die bepalings van die konvensies van 1931 op hulle toegepas moes word. Die komitee was van mening dat die ander stowwe van die dolantien-soort (bemidoon, ketobemidoon, NU-1196, NU-1779) vir toepaslike behandeling wanneer die protokol van 1948 van krag word, aangeteken moes word.

Metadoon (*Amidoon*). Dieselfde bepalings behoort van toepassing te wees op hierdie verdowingsmiddel en stowwe van soortgelyke chemiese samestelling vanweë hulle gewoontevormende eienskappe.

Voorsorgmaatreëls in Verband met Sintetiese Stowwe. Die komitee was van mening dat regerings met die grootste sorg hulle oog moet hou oor sintetiese middels wat op soortgelyke wyse as dié wat reeds ondersoek is, saamgestel is en wat gewoontevormende eienskappe mag besit. Met verwysing na die ondervinding wat opgedoen is in verband met stowwe wat aan die dolantien- en metadoon-groepe behoort, het die komitee aanbeveel dat enige nuwe konvensie behoort te bepaal dat stowwe van 'n besondere chemiese aard wat analoog is met stowwe wat gewoontevormend geblyk het, onder beheer geplaas behoort te word totdat bewys is dat hulle nie gewoontevormend is nie.

Heroïen (*Diasetielmorfien*). Die komitee het sy besorgdheid daaroor uitgespreek dat hoewel die gevaarlike aard van heroïen nou algemeen erken word, die verbruik van hierdie middel in sekere lande aansienlik toegeneem het. Dit is bekend dat heroïen giftiger as morfien is aangesien die pynstillende uitwerking daarvan van vier tot agt maal sterker is. Die uitwerking daarvan op die senuweestelsel is baie groter en 0.007 g. heroïen is genoeg om asemhalingsverlamming te veroorsaak. Gedurende die afgelope 50 jaar het heroïen groot verwoesting in die wêreld aangerig. Dit is vreemd dat heroïen in sekere lande nog taamlik algemeen voorgeskryf word terwyl dit in ander lande glad nie meer gebruik word nie. Die komitee was van mening dat verdere inligting dringend ingewin moes word oor die redes waarom aansienlike hoeveelhede heroïen nog steeds in sekere lande gebruik word. Sulke gegewens sou deur middel van die *World Medical Association* ingewin kon word. Daarbenewens sou regstreeks navraag gedoen kon word deur deskundiges te stuur om van plaaslike geneeshere en siekteversekeringsdienste die redes te verneem waarom hierdie middel met voorkeur bo ander middels voorgeskryf word.

Morfaan. Die komitee is meegedeel dat Duitse en Amerikaanse skeikundiges deur regstreekse sintese 'n samestelling uitgevind het bekend as morfaan waarin die struktuur van die morfien-alkaloïed soos hy natuurlik voorkom, baie amper verkry is. Hierdie moeilike sintese is op die oomblik nie 'n handelsmoontlikheid nie; maar met die sintese van ander samestellings verwant aan morfien word voortgegaan en die vordering

convertible to dihydromorphine, a habit-forming drug. These considerations apply equally to other esters of dihydrocodeine and their salts, and to dihydrocodeine and its salts.

Dolantin (*Demerol, Pethidine, Pirodosal*) (*1-methyl-4-phenyl-piperidine-4-carboxylic acid ethyl ester*). Because of the powerful habit-forming properties of this substance and its salts, the committee recommended that they should be governed by the provisions of the 1931 Conventions. The committee considered that the other substances of the dolantin type (bemidone, ketobemidone, NU-1196, NU-1779), should be noted for appropriate action when the 1948 protocol comes into force.

Methadone (*Amidone*). The same provisions should apply to this drug and substances of similar chemical structure, on account of their habit-forming properties.

Precautionary Measures with Regard to Synthetic Substances. The committee was of the opinion that governments should watch with extreme care synthetic drugs of similar structure to those already examined, which may prove to have habit-forming properties. With reference to the experience already gained with substances of the dolantin and methadone groups, the committee recommended that any new convention should provide that substances of a particular chemical type, analogues of which have proved to be habit-forming, be placed under control until such time as they are shown not to be habit-forming.

Heroin (*Diacetylmorphine*). The committee expressed its alarm that although the dangerous nature of heroin is now universally recognized, consumption of this drug has increased considerably in certain countries. Heroin is known to be more toxic than morphine, as its analgesic effect is from four to eight times more powerful. Its effect on the nervous system is much greater and 0.007 g. of heroin is sufficient to induce respiratory paralysis. Over the last 50 years, heroin has caused great havoc in the world. It is strange to note that in some countries heroin continues to be widely prescribed, while others have completely ceased to use it. The committee was of the opinion that further information was urgently needed on the reasons for the continued use of considerable quantities of heroin in some countries. Such data might be obtained through the *World Medical Association*. In addition, direct inquiries might be undertaken on the spot by sending experts to ascertain, from local physicians and sickness insurance services, the reasons why this drug is prescribed in preference to others.

Morphan. The committee was informed that German and American chemists have produced, by direct synthesis, a compound known as morphan, in which the structure of the naturally occurring morphine alkaloid has been very nearly attained. This difficult synthesis is not at the moment a commercial possibility, but the

wat met hierdie navorsing gemaak word, behoort noukeurig dopgehou te word.

Ten slotte is die komitee getref deur die verskeidenheid van name wat verskillende vervaardigers aan dieselfde middel gee. Ten einde dubbelsinnigheid te vermy was dit inderdaad nodig om die volledige skeikundige formules van die stowwe aan te gee. Die komitee het die aandag gevestig op die voordele wat daaraan verbonde sou wees indien aan elke stof 'n erkende naam deur 'n gesaghebbende (verkieslik 'n internasionale) liggaam gegee kon word.

synthesis of other compounds related to morphine is going forward and the progress of this research should be watched very carefully.

Finally, the committee was impressed by the variety of names given to the same drug by different manufacturers. Indeed, to avoid ambiguity, it had been necessary to give the full chemical formula of these substances. The committee drew attention to the advantages which would result if each substance could be given a recognized name by some authoritative (preferably international) body.

CARONAMIDE*

ITS DOSAGE AND USE AS AN ENHANCING AGENT IN PENICILLIN THERAPY IN CHILDREN

GAVIN HILDICK-SMITH, M.B., D.C.H.

Eagle and his co-workers[1] have shown that a maximal bactericidal effect produced by penicillin occurs when penicillin is maintained at a certain optimal level for a specific length of time.

For susceptible strains of *Streptococcus pyogenes, Pneumococcus* and *Staphylococcus aureus* this *in vitro* level is between 0.1 unit per c.c. and 0.425 units per c.c. (2-10 times the minimal bacteriostatic level) and the length of time from 1½ hours to 20 hours respectively.

If these conditions approximate those occurring *in vivo*, it should be possible, knowing the sensitivity of an infecting organism, to obtain an optimal penicillin plasma level, for a sufficient time and thereby overcome the infection.

One of the difficulties in achieving this desired result, however, is the rapid loss of penicillin through the kidneys.

There are two obvious ways of trying to overcome this disadvantage. One is to provide a sufficient intake of penicillin, by frequent injection or a source of constant absorption, such as penicillin in oil and beeswax or procaine penicillin; the second, which is the subject of this paper, is to decrease the rate of plasma penicillin clearance by the kidneys.

It has been shown that in each circulation through the kidney the passing blood is completely cleared of penicillin, 20% by the glomerular filtration and 80% by the tubular excretion.

If the tubular excretion mechanism could be blocked, the rate of renal clearance would be decreased to one-fifth of normal.

The first attempt in this direction was to give a substance such as para-amino-hippuric acid which uses the same tubular mechanism for excretion as penicillin, so that by competition it would prevent tubular penicillin excretion. However, since an effective suppression would be only achieved through a mass action effect, such large quantities of competing substance had to be given continuously that it was not therapeutically practical.

Beyer[2] approached the problem differently. He used the drug 4 carboxyphenylmethanesulfonanilide-caronamide[3, 4] which (although it is itself excreted only by the glomerular route) combines in a reversible fashion with the enzyme of the tubules which is essential for the excretion of penicillin. Tests in animals showed its delaying effect on penicillin excretion and revealed a low incidence of toxicity.

Following these trials it was shown by Rapoport *et al.*[5] that when given in doses of 0.1, 0.2 and 0.4 gm. per kg. per day to normal convalescent children, there was no measurable interference with normal renal function, its toxicity was of a low order and in combination with intramuscular penicillin it enhanced the plasma levels obtained from 2.8 to 14.5 times those obtained with penicillin alone.

Following these trials it was then decided to determine an optimal dose for use in children.

METHOD

As no method for blood caronamide determination[6] was available at this time, an indirect means of determining the optimal dosage was used.

Since complete suppression of tubular excretion of penicillin would result in a constant loss of plasma penicillin by the glomeruler route only, the detection by serial plasma penicillin measurements of a constant rate of loss, despite increasing doses of caronamide, would indicate that the smallest dose of caronamide resulting in that rate of loss had completely suppressed tubular excretion. Further evidence was obtained by calculating mathematically[7] the rate of clearance of plasma penicillin that would be expected if only the

* At the request of the Council on Pharmacy and Chemistry of the American Medical Association, the original designation caronamide has been changed to carinamide.

Carinamide is the generic name for 4′-carboxyphenylmethanesulfonanalide, supplied under the trade mark of staticin by Sharpe and Dohme, Inc., Glenolden, Pa., U.S.A.

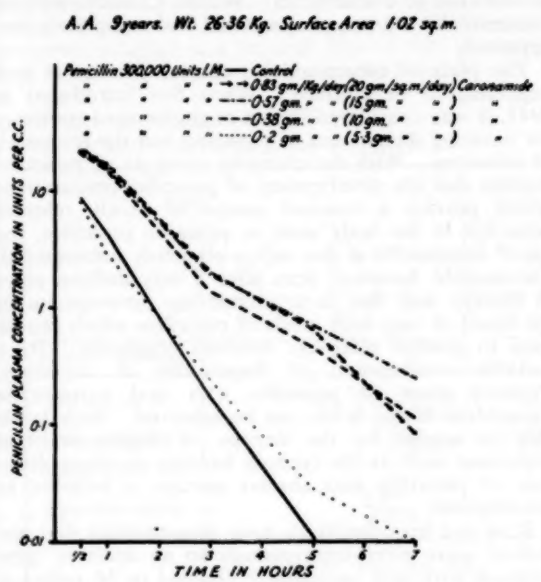

FIG. 1

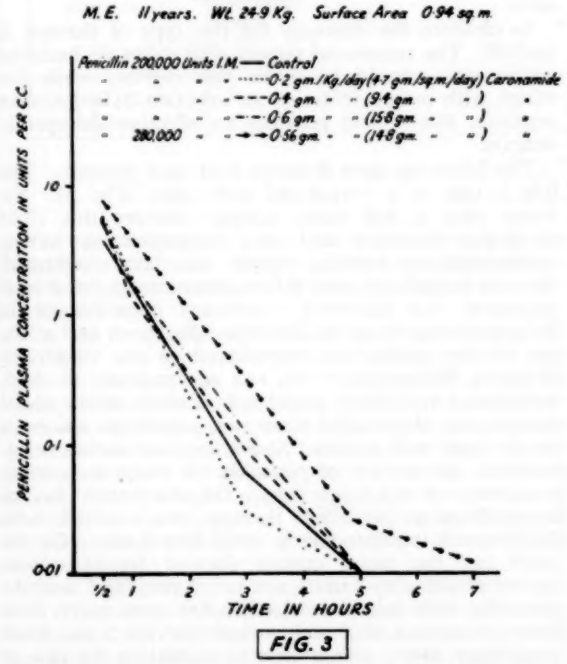

FIG. 3

glomerular route was available. A comparison of the theoretical rate and the actually measured rate could then be made. If the measured rate of excretion was identical or slower than the calculated rate then 100% tubular suppression was considered to have been achieved.

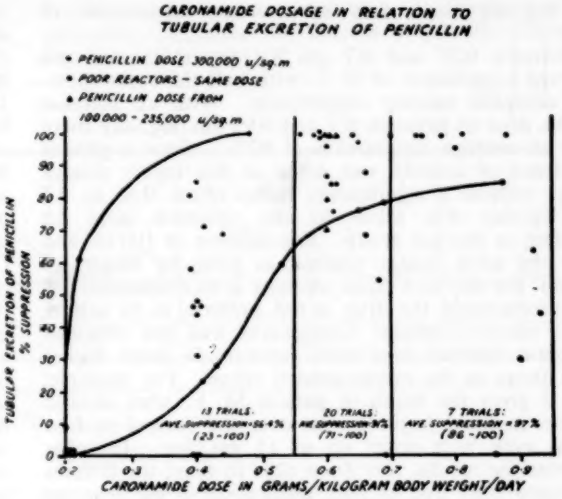

FIG. 2

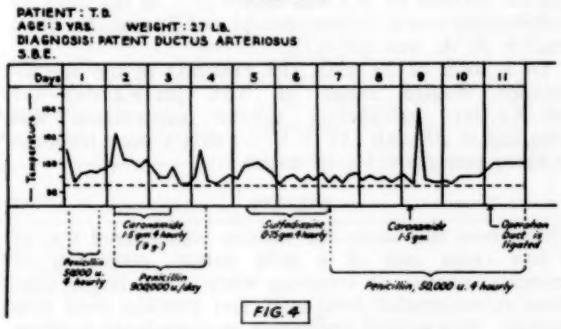

FIG. 4

In this study 21 afebrile convalescent children with normal renal function, between the ages of 2-9 years were used. The penicillin was commercial crystalline penicillin consisting of 90% G-penicillin.

A modified Rammelkamp method of bio-assay was used for the plasma penicillin determinations.

The penicillin was given intramuscularly (calculated on the basis of 300,000 units per square metre of body surface, approximately 10,000 units per kg. body-weight) dissolved in physiological saline. As a control, penicillin alone was given, and blood drawn for assay at ¼, 1, 3, 5 and 7 hours. Two days later the same patient received the same dose of penicillin together with oral caronamide—the latter being increased on each successive trial and ranging in dose from 5 to 20 gm. per square metre per day (0.2-0.9 gm./kg. day).

In Fig. 1 the results in a typical patient are shown. It is easy to see that the constant rate of excretion was achieved with a dose of 0.57 kg. per 24 hours and that increasing the amount of caronamide did not decrease the rate of penicillin excretion.

Fig. 2 gives a graphic summary of the results obtained; at a level of 0.2 gm./Kg./day there was no

apparent suppression, except in one case—at 0.4 gm./Kg./day there was an average suppression of 56.4%.

Between 0.55 and 0.7 gm./Kg./day there was an average suppression of 91%, with half the cases showing complete tubular suppression. With an increase of the dose to between 0.7 and 0.92 gm./Kg./day there was an average suppression of 97%. Since a greater incidence of toxicity was noted at this higher dosage range without a significantly better effect, 0.55 to 0.7 gm./Kg./day was taken as the optimum dose for children in this age group. For children of 100 lb. and over the adult dosage scheme, as given by Boger[9] of 24 gm. per day in 6 equal aliquots is recommended.

Unfortunately the drug is not uniform in its action, since effective tubular suppression was not obtained in some children even with caronamide doses higher than those in the recommended range. For example, Fig. 3 gives the result in patient M. E. who showed only a minimal improvement over the control in four trials, even with doses up to 15 gm./day. In other patients the results vary from time to time; the failures are apparently due to poor absorption of the ingested caronamide since the urinary excretion in the poor reactor (patient M. E.) was only 0.25% of the ingested caronamide over a 28-hour period—while that of a good reactor A. A. was 60—67%.

Of a total of 23 trials (15 patients) in the recommended dosage range of 0.55 gm./Kg./day—0.7 gm./Kg./day, satisfactory tubular suppression was obtained in 20 trials (17 or 87%) with a poor response in three patients (13% of trials).

TOXICITY

Throughout this series the toxicity encountered was of a low order and of a mild nature, consisting of anorexia, nausea or vomiting when doses larger than those recommended were used, and transient mild skin lesions. A transient pentosuria was observed in three patients by Rapoport *et al.*[5] However, severe reactions can occasionally occur, as was observed in two of a series of clinical cases in which the drug has since been used.

The first was a case of a 2½-year-old white boy, who had a seborrhoeic dermatitis, with a marked sensitivity to *Staphylococcus aureus*. He was given a course of caronamide with penicillin for a period of 16 days. Six days later a second course was started using 0.6 gm./Kg./day. Following the second aliquot of 0.27 gm. he developed an extensive maculo-papular rash with a rectal temperature up to 103° F. The symptoms disappeared in 24 hours after discontinuing treatment. Five days later a single test dose produced a similar but more severe reaction. A leucopenia was not observed on either occasion.

The second child (Fig. 4) was a 3-year-old white boy, with a patent ductus arteriosus, who was being treated for subacute bacterial endocarditis. He received caronamide for two days without apparent ill effect. Six days later he received one dose of 1.5 gm. out of a total daily dose of 0.6 gm./Kg./day. Four hours after administration he developed rigors and a rectal temperature of 105° F., with a diffuse erythema, but no evidence of a leucopenia. Within 12 hours without treatment his signs and symptoms had completely disappeared.

The place of caronamide in clinical practice is now beginning to be clarified. When first introduced in 1947, it was considered that it might be used routinely for reducing the amount of penicillin and the frequency of injections. With the changing concepts of penicillin therapy and the development of penicillin preparations which provide a constant source of slowly released penicillin in the body such as procaine penicillin, the use of caronamide in this way is obviously not required. Caronamide, however, does have a very definite place in therapy and that is to enable the development in the blood of very high levels of penicillin which can be used to combat relatively resistant organisms. By a suitable combination of large and, if necessary, frequent doses of penicillin with oral caronamide tremendous blood levels can be achieved. Such levels may be needed for the therapy of highly resistant organisms such as the typhoid bacillus or where diffusion of penicillin into abscess cavities is required in osteomyelitis.

King and his co-workers have demonstrated that one million units given intravenously to an adult in combination with oral caronamide resulted in 56 units/c.c. in 30 minutes and 13 units/c.c. at 3 hours as opposed to 32 and 2 units per c.c. respectively without caronamide.

In children the necessity for this type of therapy is limited. The occasional patient with subacute bacterial endocarditis should be given this regime, while for others with osteomyelitis or an infection by a resistant organism this regime provides an effective therapeutic weapon.

The following cases illustrate four such patients. The first is that of a 5-week-old male child (Fig. 5). Six hours after a full term, normal delivery this child developed jaundice and was diagnosed as having erythroblastosis foetalis, which was later confirmed. He was transfused with Rh-negative blood on several occasions, but following temporary improvement in his general condition, he developed diarrhoea and at the age of five weeks was transferred to the Children's Hospital, Philadelphia. He was an extremely ill child, dehydrated and deeply jaundiced. Culture of the blood stream and of material from two superficial abscesses of the chest wall revealed *Staphylococcus aureus* sensitive to 1 unit per c.c. of penicillin (50 times the normal sensitivity of this organism). On the fourth day of hospitalization penicillin therapy was started with 20,000 units intramuscularly every four hours. On the sixth day the blood culture showed *Staphylococcus aureus* sensitive to 2 units per c.c. of penicillin, and the penicillin dose was raised to 100,000 units every three hours, combined with oral caronamide in 0.5 gm. doses every four hours, with a view to increasing the rate of penicillin diffusion into the abscess cavities, and thus sterilizing them. On the tenth day a plasma penicillin level of 70 units at three hours after penicillin injection was obtained, by which time the blood culture had become negative, although the abscesses had not been sterilized. On the eleventh day the child's condition

was very grave, with severe anorexia, thought to be due to the caronamide. This was stopped for 24 hours and then was restarted in a reduced dose of 0.25 gm. every four hours and continued for a further 19 days.

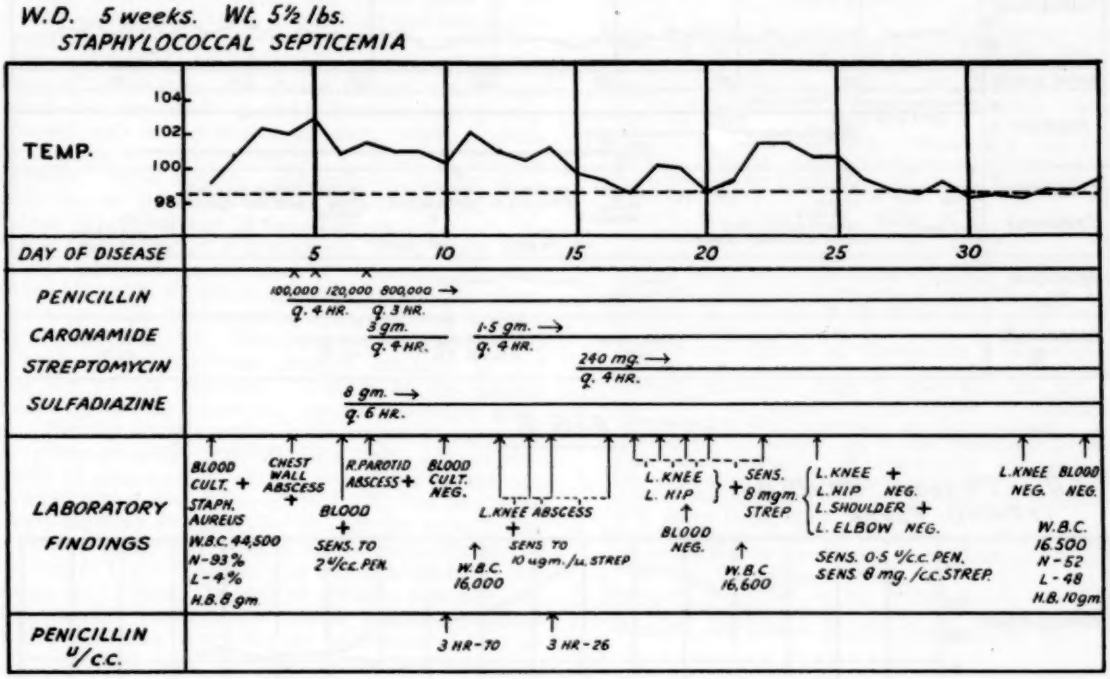

FIG. 5

During the course of the illness, involvement of the right parotid gland, left knee, left hip, left shoulder and left hip occurred, with positive culture from each of these sites.

On the fourteenth day streptomycin in a dose of 60 mg. every four hours was given. As the organism was found to be sensitive to 10 micrograms, this combined therapy was continued until the fortieth day, by which time all cultures were persistently negative, the temperature was normal and the child was eating well and gaining weight. In this case sterilization of the blood stream was brought about by the combination of penicillin and caronamide, and with the assistance of streptomycin sterilization of the multiple abscesses was achieved.

Case 2 (*Fig.* 6). F. R., a 10-month-old white child was transferred to the Children's Hospital from another institution, having been treated for diarrhoea with parental fluids with no improvement in his condition.

He was a severely ill child, thin, pale and dehydrated, with oedema of both legs, secondary to saphenous vein thrombosis following infusions via these veins. A large red area over the head of the left tibia was also present and appeared to be the site of a tibial marrow infusion. Aspiration of this site revealed an abscess with underlying osteomyelitis of the tibia from which was cultured *Staphylococcus aureus* sensitive to 0.5 units per c.c. penicillin (25 times the normal sensitivity for this organism).

He was started on penicillin 50,000 units 4-hourly and later streptomycin; 30 days after this therapy the culture was still positive and he was put on caronamide, 1 gm. 4-hourly and the streptomycin stopped. Penicillin blood levels of 2.1 units per c.c. at ½-hour and 1.5 units per c.c. at three hours were obtained on two separate occasions.

After a further 40 days on this therapy, all evidence of osteomyelitis of the tibia had disappeared and the skin wound had closed, culture of the wound having become negative 40 days from the commencement of the penicillin and caronamide therapy. In this child 24-hour urine recovery studies of caronamide were performed and figures of 43%, 24%, 18%, 13%, 8% and 4.3% were obtained, with an average of 19% in the seven studies performed.

Boger[9] has shown than an average recovery of 47% is obtained when optimum dosage is being achieved, leading to a satisfactory blood caronamide level of between 20-40 mg. per 100 c.c.

This case illustrates one of the problems of caronamide therapy, viz. the variability of absorption of caronamide as shown in this instance by the varying quantities recovered from the urine. In retrospect, a quicker response to therapy might have been obtained

F. R. 10 months. Wt. 14 lb. 5 ozs.
OSTEO. L. TIBIA

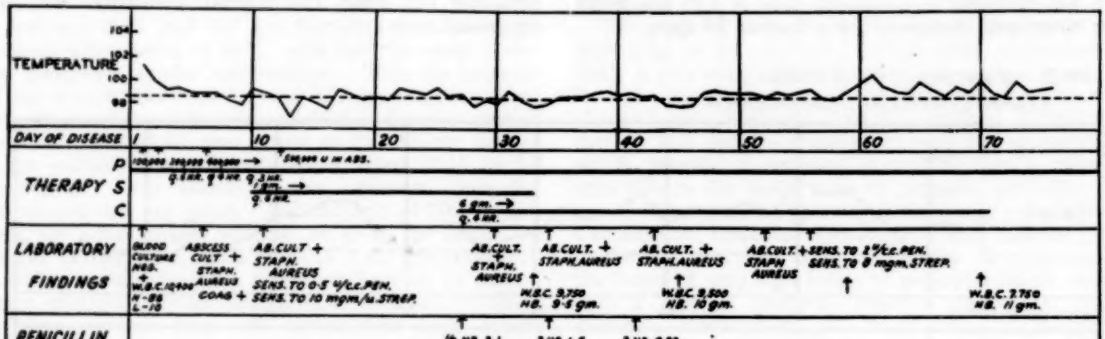

FIG. 6

J. B. 2½ years. Wt. 29 lbs.
TYPHOID FEVER

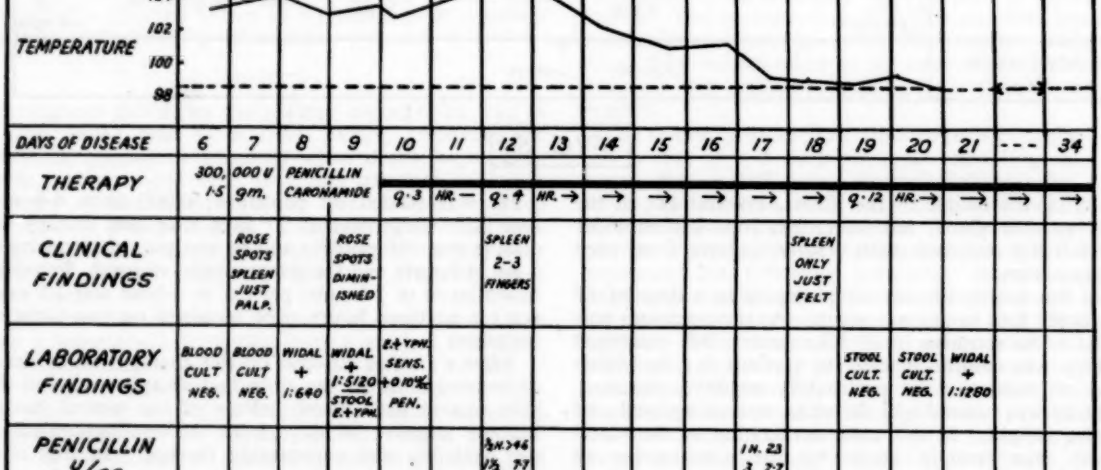

FIG. 7

if larger doses of penicillin had been given with the caronamide.

Case 3 (*Fig.* 7). This was a 2½-year-old boy who was admitted with a diagnosis of typhoid fever on the sixth day of his illness. The diagnosis was not confirmed until four days later, when a positive blood culture revealed the organism, which was sensitive to 10 units per c.c. of penicillin and the Widal reaction had increased in titre from 1:640 to 1:5120.

He was started on penicillin 50,000 units 4-hourly

and caronamide 1.5 gm. 4-hourly. Penicillin plasma levels of 46 units per c.c. at ½ hour, 23 units per c.c. at one hour and 7.7 at three hours were obtained. On the occasions tested a 30% recovery of caronamide from the urine was obtained, and blood levels at 24 mg. and 16 mg. per 100 c.c. at one hour and four hours respectively.

Although in this case one cannot say that the natural course of the disease was altered in any way, it was noticed that the child's general condition was greatly improved and he became more alert, with a great improvement in appetite, within 36 hours of starting treatment. Stool cultures were negative by the nineteenth day of his illness and he was discharged after 28 days in hospital and 24 days therapy.

Case 4 was that of a 2-week-old, 8 lb. white boy, R. H., admitted as a case of bilateral bronchopneumonia with a pleural effusion in the left chest. He was seriously ill, dyspnoeic, cyanosed, with a rectal temperature of 103° F. Blood culture revealed *Staphylococcus aureus,* coagulase positive, sensitive to 0.5 units per c.c. of penicillin. Culture of the pleural effusion grew *Staphylococcus aureus,* coagulase negative. Initially he was treated with oxygen therapy and was given penicillin 200,000 units daily and sulphadiazine 12 grains daily. At the end of the second day his temperature had fallen to 99.5° F., but continued to vary between 99° and 101° F. On the seventh day of illness, being still acutely ill, he was started on caronamide ½ gm. 4-hourly and was continued on this therapy for 11 days. In spite of previous penicillin and sulphonamide therapy, the blood culture remained positive until two days after the institution of caronamide. At this time his temperature had settled to normal and he showed clinical improvement. A blood penicillin level at this time was 0.36 units per c.c. at three hours. His general condition improved rapidly, with X-ray evidence of resolution of the pneumonia and absorption of the pleural fluid, and he was discharged home after 20 days of hospitalization or 13 days after institution of caronamide therapy.

This is a case in which infection failed to resolve with standard therapy but by raising the penicillin level the infection was satisfactorily overcome.

SUMMARY

In spite of the fact that caronamide has been found to have a low order of mild toxic reactions and that its absorption from the gastro-intestinal tract is variable, it has a definite place in penicillin therapy.

By reversibly blocking that portion of penicillin excreted by the tubules, it can be used to achieve and maintain higher penicillin levels that could only otherwise be achieved by massive and very frequent penicillin administrations.

Given orally to children in a dose of 0.5 to 0.7 gm./Kg./day in 4-hourly aliquots, it may be used in those cases of infection caused by organisms of relative resistance to penicillin, such as typhoid fever, or in those cases, as abscess formation or subacute bacterial endocarditis, where a high diffusion gradient of penicillin is required to achieve a bactericidal level in the foci of infection.

I am greatly indebted to Dr. T. F. McNair Scott for his very kind assistance and to Prof. J. Stokes for his permission to publish these cases which were under his care, at the Children's Hospital, Philadelphia.

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REVIEWS OF BOOKS

CHILDREN NEVER TELL

Children Never Tell. By Gwendolen Freeman. (Pp. 274. 8s. 6d.) London: George Allen & Unwin Ltd. 1949. South African Representative: Howard B. Timmins, Monarch House, 58-60 Long St., Cape Town.

Contents: Part I. Myself. 1. They Never Tell. 2. Surroundings. 3. Night Fears. 4. Day Fears. 5. The War. 6. Melancholia. 7. Sins. 8. Cruelties. 9. Amusements. 10. School. 11. Religion. 12. Illness. 13. Flowers. 14. Adorations. 15. Hazy World. 16. Ambitions. 17. The Arts. 18. Now, I . . .
Part II. Other Children. 19. Other Children. 20. Susan. 21. Ken. 22. Margaret. 23. Henry. 24. John Jervis. 25. Conor. 26. Conclusion.

As a child, the author vowed that she would remember what it had been like to be a child and in her book she has attempted to recapture some of her memories and reactions to the things that went on about her. For those who have a sympathy for children and their troubles, which so often seem so small to the adult and are so very real to the young, this book will help them to a deeper knowledge of the mind of the child, for it is correctly said that 'children never tell' all that passes through their minds and many gaps have to be filled by the understanding parent.

One thing, however, is lacking, for although the childish fears and fancies are well described, no attempt has been made to indicate a course of action to help the child to adjust itself. Perhaps the author meant that an increased comprehension of the child mind would lead the person concerned to take what steps might be necessary from time to time in the light of the increased understanding.

ILLUSTRATIONS OF SURGICAL TREATMENT

Illustrations of Surgical Treatment—Instruments and Appliances. By Eric L. Farquharson, M.D., F.R.C.S. (Ed.), F.R.C.S. (Eng.). With a foreword by the late Sir John Fraser, Bt. (Pp. 404 + xii. With 383 photographs and diagrams. 25s.) Edinburgh: E. & S. Livingstone Ltd. 3rd ed. 1949.

Contents: I. Infusion and Transfusion. 1. Intravenous Saline Infusion. 2. Transfusion of Blood and Protein Fluids.
II. Vertebral Column and Ribs. 3. Fractures and Dislocations of the Spine. 4. Tuberculosis of the Spine (Pott's Disease). 5. Fractures of the Ribs.
III. Shoulder Girdle and Upper Extremity. 6. Injuries of the Clavicle. 7. Dislocation and Fracture Dislocation of the Shoulder. 8. Fractures of the Humerus. 9. The Elbow Region. 10. Fractures of the Forearm. 11. Injuries about the Wrist. 12. Injuries of the Hand and Fingers.
IV. Pelvic Girdle and Lower Extremity. 13. Fractures of the Pelvis. 14. The Hip Joint. 15. Fractures of the Neck of the Femur. 16. Fractures of the Shaft of the Femur. 17. The Knee Joint. 18. Fractures of the Lower Leg. 19. Injuries to the Ankle Joint. 20. Fractures of the Calcaneum. 21. Deformities of the Foot. Appendix.—Instruments and Appliances. Index.

The title of this book embraces far more than does the subject matter. A glance at the contents shows that it is divided into three parts. The first is devoted to intravenous medication, the second to orthopaedic treatment and the third to surgical instruments.

The third part is simply a series of pictures of surgical instruments with brief explanatory notes of their application. The second part on orthopaedic treatment is well illustrated, detailed and instructive, and embraces most orthopaedic conditions. The first part gives practical instruction on intravenous infusions, and the section devoted to blood transfusion is helpful and practical, and is not clouded by a mass of theoretical detail. The first two parts would seem to have some value for the student or house surgeon in that the orthopaedic section is detailed to a degree not usual in the ordinary text-book. In the last section, however, the illustrations are no better than those in the average instrument catalogue and the additional information seems sparse in the extreme.

OPERATIVE OBSTETRICS

Operative Obstetrics. By J. M. Munro Kerr, LL.D., F.R.C.O.G., M.D., F.R.F.P.S.G., and J. Chassar Moir, M.A., M.D., F.R.C.S.E., F.R.C.O.G. (Pp. 948 + viii. With 390 illustrations. £3 3s. 0d.) London: Baillière, Tindall & Cox. 5th ed., 1949.

Contents: Part I. 1. Introductory. 2. Antenatal Investigation. 3. Intranatal Care. 4. Anaesthetics,, Analgesics and Sedatives.
Part II. 5. The Expulsive Forces in Labour.
Part III. 6. Occipito-posterior Positions of the Vertex. 7. Face and Brow Presentations. 8. Breech Presentation. 9. Transverse or Oblique Lie. 10. Plural Pregnancy. 11. Abnormal Size of the Foetus. 12. Abnormalities connected with the Cord, Placenta, and Membranes.
Part IV. 13. Deformities of the Bony Pelvis. 14. Diagnosis of Pelvic Deformities. 15. Treatment of Pelvic Deformities. 16. Abnormalities of the Utero-vaginal Canal. 17. Tumours and Extra-genital Infections complicating Pregnancy, Labour and the Puerperium. 18. Displacements of the Uterus. 19. Dystocia associated with Malformations of the Uterus and Vagina.
Part V. 20. Preparation for Vaginal Operations. 21. Forceps. 22. Caesarian Section. 23. Enlargement of the Pelvic Capacity. 24. The Artificial Termination of Pregnancy. 25. Accouchement Force. 26. Destructive Operations on the Foetus. 27. Manual Removal of the Placenta. 28. Interrupted Gestation. 29. Ectopic Pregnancy. 30. Haemorrhages of the Later Months of Pregnancy. 31. Post-Partum Haemorrhage.
Part VI. 32. Injuries to the Mother. 33. Accidents and Complications of the Immediate Post-Partum Period. 34. Accidents to the Child. 35. A Review of the Factors influencing Maternal Mortality, Still-births and Neonatal Deaths (by C. Scott Russell).

It is 12 years since the last edition of this classic work was released; the publication of the fifth edition—more pregnant (by 102 pages) than its predecessor—will be welcomed by all interested in obstetrics. Professor Chassar Moir, of Oxford, has replaced Drs. Donald McIntyre and Fyfe Anderson and lends a pseudo-English atmosphere to the publication which nevertheless remains fundamentally Scottish in the soundness of its teaching. The book has been in great part rewritten and the subject matter rearranged but, as with previous editions, it deals first and foremost with the diagnosis and treatment of the complications of labour. Anaesthesia and analgesia are much more fully dealt with. In particular, stress is laid upon the unsuitability of chloroform in pregnancy and labour. This opinion, originating north of the Tweed, will perhaps persuade the diehards of the dangers of this drug. Spinal anaesthesia for routine abdominal obstetrical surgery is viewed with disfavour while local anaesthesia is strongly recommended. The problem of breech presentation is extensively dealt with and the attitude is admirably conservative. External version under anaesthesia is condemned, as is the practice of bringing down a leg—except under extreme provocation. The well-established but much neglected axiom that more breeches are lost by undue and misdirected zeal than by intelligent idleness and delay, is repeatedly stressed. At the same time, the bugbear of the frank breech is exploded.

Several chapters are very properly devoted to the essence of obstetrics: disproportion and induction of labour as a treatment are fully and fairly discussed. Radiographic diagnosis, particularly pelvimetry, receives detailed treatment and for our builders of to-morrow, is worthy to quote: '... the time has already come when an obstetric hospital without radiographic facilties within easy reach of the labour ward, is as great an anachronism ... as a heart hospital without an electro-cardiograph.'

The chapters on the haemorrhages of pregnancy have been brought up to date and are followed by a footnote which deals with the practical points of blood transfusion, the Rh factor and all its implications.

This book is written primarily for obstetricians but should be carefully studied by all prospective specialists and general practitioners who are seriously interested and actively engaged in obstetric practice. As a book of reference it is invaluable, as a comprehensive and accurate bibliography is added to the extensive experience of the authors.

TROPICAL DISEASES

An Epitome of the Laboratory Diagnosis and Treatment of Tropical Diseases. By Horace M. Shelley, F.R.F.P.S., M.R.C.P. (Lond.), D.T.M. & H. (Eng.). (Pp. 147. 25s.) London: Staples Press Ltd. 1949.

Contents: 1. Examination of the Blood. 2. Blood Diseases in the Tropics. 3. Protozoal Diseases. 4. Virus Diseases. 5. The Dysenteries and Liver Abcess. 6. Bacterial Diseases. 7. Nutrition and Deficiency Diseases. 8. Climatic Diseases. 9. Snake Poisons and Myiasis. 10. Miscellaneous Diseases. 11. Diseases due to Fungi. 12. Diseases due to Helminths. 13. Compendium of Drugs. 14. Laboratory Notes.

In the preface to this book the author states that its object is to supply the busy practitioner of medicine in the tropics with simple details of laboratory diagnosis and treatment of diseases common in those climes. Used purely as a guide, it should prove useful to those working far from skilled guidance, as the author has listed for the most part only the well-tried standard methods, sifting out the essentials from the frills one finds in the larger works. As regards laboratory work, however, it is debatable how much the man with no specialist training should undertake. The ordinary practitioner, for whom the book is presumably intended, may well find himself in deep waters. The elementary procedures, such as blood counts, blood films and amoebic stools, are given in great detail, and certainly no one should venture into the tropics without this knowledge. One would have thought, therefore, that the more complicated investigations mentioned in the book, such as the various agglutination tests, the biochemical tests in the enteric group, or the infection of mice intracerebrally with yellow fever blood, e.g., should be given in greater detail if they are to be included at all. Anyone not knowing how to do a Leishman stain is not likely to get very far with a mouse brain. There are frequent references

to the use of various media, but no mention is made of how to prepare even the few essential ones, nor are they included in the otherwise useful list of essential equipment for a small laboratory, and there is no guide to the use of the apparatus mentioned.

The reviewer has no doubt that there is need for a book of this sort, especially as the larger books are usually cluttered with the less common or untried procedures, and, in using the larger books, a certain amount of basic ability in the reader is presumed. It is to be hoped, therefore, that in a future edition the author will give more of the elementary guidance for those for whom the book has primarily been written. Even the experienced practitioner may, however, find some useful tips in this little book—e.g., a simple method of doing the Ide test—and all workers in the tropics and subtropics can profitably add this volume to their books of reference.

BLOOD TRANSFUSION

Blood Transfusion. Ed. by Geoffrey Keynes, M.A., M.D., F.R.C.S. (Pp. 586 + xii. With 110 illustrations. 52s. 6d.) Bristol: John Wright & Sons, Ltd. 1949.

Contents: 1. The History of Blood Transfusion. 2. The Indications. 3. The Complications. 4. The Blood Groups. 5. The Blood Donor. 6. The Technique of Blood Transfusion. 7. Blood Transfusion in Infancy. 8. The Storage and Preservation of Blood and Blood Derivatives. 9. Blood Derivatives and Blood Substitutes. 10. The Organization of a Hospital Transfusion Department. Index.

This book is in the nature of a symposium, each of the 10 sections being written by a well-known authority. There is an extensive bibliography appended to each section and the text is liberally (perhaps too liberally) interspersed with references. The sections on the history of blood transfusion, indications, complications and blood grouping are excellent. The Fisher nomenclature is used for the Rh system, Wiener's equivalents being given in parenthesis. The elaborate tables of possible genotypes of children with various matings could perhaps have been omitted without detracting from the usefulness of the book in the practice of blood transfusion.

The sections on the collection, preservation and storage of whole blood and blood derivatives, follow the current practice in the National Blood Transfusion Service of the United Kingdom. The use of commercially prepared vacuum containers is given only the briefest mention. The collection of blood by gravity in screw-capped Bristol bottles and the use of rubber tops with wire mesh filters for insertion into the bottles for administration has become standard practice in the United Kingdom since the war. There are undoubtedly greater opportunities for contamination of blood collected and administered in this way than when using disposable vacuum containers, and it is unlikely that the methods described will find many adherents, particularly in countries where import restrictions are not so stringent as to preclude blood transfusion accessories from being obtained from the United States, where a high stage of perfection has been achieved in their manufacture.

It is noteworthy that the preparation and use of human blood serum as opposed to citrated plasma is still given prominence. Admittedly serum can be more easily sterilized through bacterial Seitz filters, but serum has no advantage over plasma and with careful collection in vacuum containers contamination of plasma can be easily avoided. Serum processing also involves loss of the cells in the form of clot, a stupendous waste when one considers the universal shortage of blood donors and the usefulness of resuspended or concentrated cells. Red cells obtained as a by-product of plasma processing will serve as well as and perhaps better than whole blood in many conditions of anaemia where the need is to increase the cell count rather than the circulating fluid volume. The section on blood derivatives and blood substitutes is too discursive to be of any real practical value. For example, only a few lines are devoted to frozen plasma, in which state most of the labile constituents have been proved to be more easily than and as satisfactorily preserved as in the dehydrated form.

MAY AND WORTH'S DISEASES OF THE EYE

May and Worth's Manual of Diseases of the Eye. By Montague L. Hine, M.D. (Lond.), F.R.C.S. (Eng.). (Pp. 548 + xii. With 32 plates. 22s. 6d.) London: Baillière, Tindall & Cox. 10th ed. 1949.

Contents: 1. Examination of the Eye. 2. Subjective or Functional Examination of the Eye. 3. Objective Examination of the Eye conducted in the Dark-room. 4. Affections of the Eyelids. 5. Diseases of the Lacrymal Apparatus. 6. Diseases of the Orbit. 7. Diseases of the Conjunctiva. 8. Diseases of the Cornea. 9. Diseases of the Sclera. 10. Diseases of the Iris. 11. Diseases of the Ciliary Body. 12. Diseases of the Choroid. 13. Intra Ocular Tumours. 14. Glaucoma. 15. Diseases of the Vitreous. 16. Affections of the Lens. 17. Diseases of the Retina. 18. Diseases of the Optic Nerve. 19. Amblyopia and Functional Affections of the Retina. 20. General Optical Principles. 21. Optical Consideration of the Eye. 22. Errors of Refraction. 23. Paralyses of External Ocular Muscles. 24. Comitant Squint. 25. Heterophoria. 26. Operations on the External Ocular Muscles. 27. The Ocular Manifestations of General Diseases. 28. Ophthalmology in the Tropics. 29. Ocular Therapeutics: General Rules for Operations upon the Eye. 30. Visual Requirements for the Public Services.

This useful, interesting and thoroughly practical book should find a place on the shelves of all members of the profession who are in general practice. Its aim in catering particularly for the general practitioner and the student has been successfully achieved and Montague Hine is to be congratulated on incorporating in it a wealth of very practical information drawn from his own experience.

Penicillin and sulphonamide therapy are discussed in the treatment of various pathological conditions and brief mention is made of the place of streptomycin in ophthalmology.

Contact lenses, and the use of plastics in making artificial eyes and spectacle lenses, are dealt with and the section on refraction and retinoscopy is lucid and (unusual in textbooks on the subject) is not filled with unnecessary and confusing information.

From the students' viewpoint the feature of the book which is particularly pleasing is the short summary of the embryology, anatomy and physiology which precedes each chapter.

As a compact reference book on ophthalmology, particularly for country practitioners, this small volume cannot be excelled.

MODERN ANAESTHETIC PRACTICE

Modern Practice in Anaesthesia 1949. Edited by Frankis T. Evans, M.B., B.S., F.F.A.R.C.S., D.A. (Pp. 566 + xix. With 227 illustrations and colour plate. 55s.) Durban: Butterworth & Co. (Africa), Ltd., Lincoln's Court, Masonic Grove. 1949.

Contents: 1. History. 2. Anatomy for the Anaesthetist. 3. Physiology of Anaesthesia. 4. The Chemistry of Common Anaesthetics. 5. Volatile Narcotics and the Anaesthetic Gases. 6. Description of Apparatus. 7. The Signs of Anaesthesia. 8. Premedication. 9. The Preparation of the Patient. 10. Basal Narcosis by Means of Rectal Injection. 11. Intravenous Anaesthesia. 12. Curare in Anaesthesia. 13. Intercostal Paravertebral, Epidural and Caudal Block. 14. Spinal Anaesthesia and Analgesia. 15. Endotracheal Anaesthesia. 16. Balanced Anaesthesia. 17. Post-Operative Care and Treatment. 18. Massive Collapse of Lungs (Post-Operative Atelectasis). 19. Anaesthetic Emergencies. 20. Posture in Anaesthesia. 21. Oxygen Therapy. 22. Blood Transfusion and Fluid Replacement Therapy. 23. Anaesthesia in Children. 24. Anaesthesia in Thoracic Surgery. 25. Anaesthesia in Neurosurgery. 26. Anaesthesia for the Repair of Cleft Palate in Infancy. 27. Anaesthesia for Bronchoscopy. 28. Anaesthesia in Thyroid and Thymus Surgery. 29. Anaesthesia in Genito-Urinary Surgery. 30. Anaesthesia in Rectal Surgery. 31. Anaesthesia in Obstetrics. 32. Anaesthesia and Analgesia in Dental Surgery. 33. Anaesthesia in Old Age. 34. Anaesthesia in Diabetes Mellitus. 35. Anaesthesia and Heart Disease. 36. Anaesthesia and Analgesia in Ophthalmic Surgery. 37. Anaesthesia and the Asthmatic. 38. Shock in Relation to Anaesthesia.

Dr. Frankis T. Evans is to be congratulated firstly for his magnificent effort in successfully welding the numerous contributions into such an excellent book; and secondly for having the courage, as he says in his preface, to allow differences of opinion to remain. Because the articles are the

views of the many leading London anaesthetists and other contributors connected with them, the reader should benefit from their diverse personal views and opinions.

The book by no means covers the whole subject of anaesthesia, nor is it, one feels, intended to be a *Textbook* or *Handbook* but rather a reference for the practising anaesthetist and postgraduate student. As such it will serve a useful purpose.

The writer feels that perhaps more detail should have found print in the chapters on *Anaesthesia and Heart Disease* and *In Old Age*. Since the advance of Anaesthesia, so much more radical surgery is undertaken in these types of cases that it is felt that the assessment of the relative risk of anaesthesia should have perhaps been more fully discussed. The contributors rightly emphasize the importance of oxygenation in these cases and also as far as possible of maintaining an intact blood pressure, particularly diastolic, in the sclerotic individual. With regard to the use of cyclopropane, one is pleased to see a note of warning of the danger of causing gross cardiac irregularities when used in the aged. So many seem to overlook this important and rather common occurence.

In the excellent chapters on *Preparation of the Patient for Operation, Transfusion and Fluid Replacement Therapy, Balanced Anaesthesia* and *Shock in Relation to Anaesthesia*, the interested anaesthetist will find much stimulating material. In the latter chapter the contributor makes an important point with regard to the use of 'innocuous N_2O', one that so few medical and surgical colleagues seem to realize, viz., that the non-toxic advantage of N_2O in the shocked and very ill patients is far outweighed by the necessary curtailed use of O_2.

The writer agrees with the contributor of the chapter on *Anaesthesia in Children* that this 'should be anaesthesia without tears'. Also that the ideal form of premedication for a child has not been found, but the reviewer cannot understand the author's neglect in mentioning the usefulness of the morphine derivatives and pethidene as premedicants in children.

The book is well illustrated and the printing and paper very good. The work is recommended as a stimulating and excellent series of articles on many topics of anaesthesia and as a reference for the practising anaesthetist.

OFFICIAL ANNOUNCEMENT

NOTICE OF EXTRAORDINARY GENERAL MEETING

Notice is hereby given that an Extraordinary General Meeting of the Medical Association of South Africa will be held at Medical House, 35 Wale Street, Cape Town, on Wednesday, 8 February 1950, at 4 p.m., for the purpose of considering and, if thought fit, of passing the following addition to the Articles of Association:—

30*bis*. Notwithstanding anything to the contrary contained or implied in any Regulation, By-Law or Rule, it shall be competent for the Council in any case of emergency—as to the existence of which the Council shall have an unchallengable discretion—to frame by way of resolution passed in terms of Article 30 (*b*) Rules as to the ethical conduct of members *inter se* which shall be deemed to override and repeal any resolution of any Division or Branch which may be in conflict with such Resolution of the Council so that in so far as there may at any time be found to be any inconsistency or conflict between any relevant resolution as to ethical conduct which may have been passed or which may hereafter be passed by any Division or Branch on the one hand and any Resolution of the Council on the other, the latter, that is such Resolution of the Council, shall prevail, shall be of force and effect and shall be regarded as an ethical resolution of all Divisions and Branches of the Association to the exclusion of any conflicting resolution of any Division or Branch.

In the event of a quorum not being present, the meeting will stand adjourned until 15 February 1950, at the same time and place.

By order of the Council,
A. H. Tonkin,
Medical Secretary.

Medical House,
Cape Town.
4 January 1950.

AMPTELIKE AANKONDIGING

KENNISGEWING VAN BUITENGEWONE ALGEMENE VERGADERING

Kennis geskied hiermee dat 'n buitengewone algemene vergadering van die Mediese Vereniging van Suid-Afrika op Woensdag 8 Februarie 1950 om 4 uur n.m. te Mediese Huis, Waalstraat 35, Kaapstad, gehou sal word, ten einde oorweging te skenk aan, en indien raadsaam geag, goedkeuring van die volgende byvoeging tot die statute van die Mediese Vereniging:—

30*bis*. Nieteenstaande enigiets teenstrydig vervat of behels in enige Regulasie, Bywet of Reglement, sal die Raad bevoeg wees in enige geval van nood—oor die bestaan waarvan die Raad 'n onbestrede oordeel sal hê—die mag hê om, by wyse van 'n besluit geneem kragtens die bepalings van Artikel 30 (*b*), Reglemente op te stel betreffende die morele gedrag van lede *inter se* wat beskou sal word enige besluit van enige Afdeling of Tak wat teenstrydig met sodanige besluit van die Raad mag wees tersy te stel en te herroep sodat waar daar te enige tyd enige ongerymdheid of strydige bepalings mag bestaan tussen enige betrokke besluit aangaande morele gedrag wat deur enige Afdeling of Tak goedgekeur mag wees of hiermee goedgekeur mag word en enige Besluit van die Raad sal laasgenoemde, dit wil sê sodanige Besluit van die Raad, oorheers, geldig en van krag wees en sal beskou word as 'n morele besluit van alle Afdelings en Takke van die Vereniging met uitsluiting van enige teenstrydige besluit van enige Afdeling of Tak.

In geval 'n kworum nie teenwoordig is nie, sal die vergadering uitgestel word tot 15 Februarie 1950, om 4 uur n.m. te Mediese Huis, Kaapstad.

Oplas van die Raad,
A. H. Tonkin,
Mediese Sekretaris.

Mediese Huis,
Kaapstad.
4 Januarie 1950.

CORRESPONDENCE

HONORARY STAFFS OF HOSPITALS

To the Editor: The new year is to bring changes in the medical staffing of the hospitals of two of the provinces. May I, through the medium of the *Journal*, pay respect to the outgoing honorary staffs? They gave of their best to all those who came under their charge. For four years I worked as houseman in hospitals which, in the main, were served by general practitioners. These men (and women) showed great ability in handling the sick who came under their care. Of the honorary specialists I am not in a position to judge, but each certainly did seem to know his job.

Your editorial comment that the passing away of the honorary system 'is probably due to a form of evolution' is in keeping with events. At one hospital town in a not so prosperous area several prominent practitioners did not hold honorary appointments. I surmise that these practitioners felt that they were unable to forego any opportunities in their private practice for hospital work. I do know that much of their time in private practice was spent in the treatment of families who could not afford to pay their doctor.

These senior doctors on the honorary staff have rendered excellent service.

18 December 1949. *'Black-Eye'*

MEDICAL TREATMENT OF COLLEAGUES

To the Editor: Dr. Fine's commendable opinion of the utopian qualities of his colleagues does credit to a senior member of the profession. I find it heart-breaking to disillusion him. Others could too no doubt.

In the not too distant past I paid a handsome fee to an eminent colleague in Pretoria for services to a dependant. And only the other day I received an account for another dependant from a colleague in the Free State who would have one think the scale of fees there is considerably larger than in the big centres. I can even visualize the public having the satisfaction of reading one day, a Medical Council report on one practitioner laying a charge of exorbitant fees against another.

With due gratitude to many of our colleagues these must be exceptions, but they do occur.

'Jabby'

20 December 1949